# PATENT SPECIFICATION

1,033,320

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**Int. Cl.:—B 65 b, d.**

COMPLETE SPECIFICATION

DRAWINGS ATTACHED

## Improvements in or relating to the Wrapping of Candles and Other Articles

WE, VICTRYLITE CANDLE CO., of Oshkosh, Wisconsin, United States of America, a corporation organized and existing under the laws of the State of Wisconsin, United States of America, do hereby declare the invention for which we pray that a patent may be granted to us and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to the packaging of articles which are likely to be damaged by heat, and refers particularly, but not exclusively, to the packaging of candles, and especially candles of the graceful, hand-dipped variety that are used by discriminating hostesses to lend charm and dignity to table settings and as other evidence of gracious living.

Obviously, such candles must reach the market in attractive packages, and to give the packages that desirable final touch of elegance, the candles are individually wrapped in transparent film such as Cellophane (Registered Trade Mark) and polyvinyl, which is available upon the market in various forms and under different tradenames.

The individual wrapping of candles in this manner is, of course, not new, but heretofore the enwrapment lacked the hoped-for neatness, and it added significantly to the marketing costs. Where it was done by machine the longitudinal edges of the sheets in which the candles were wrapped were heat-sealed for their entire length and also at both ends—which, of course, produced rather unsightly outwardly projecting fins. In addition, the enwrapment was loose and baggy. Where the wrapping was done by hand, no effort was made to heat seal the longitudinal edges of the wrapper, but there was still an objectionable looseness to the enwrapment, and — most important — the hand wrapping of candles was costly.

According to the invention there is provided a method of wrapping candles or other articles which are likely to be damaged by heat, which comprises the steps of: depositing the article on a web of heat shrinkable film material which has the property of holding a charge of static electricity and by virtue thereof clinging to itself when lapped, the article being disposed lengthwise of the web, shaping the web into a tube loosely enclosing the article and bringing the longitudinal side edge portions of the web into overlapping contiguity to thereby cause the same to cling to one another, gripping the tube a short distance beyond each end of the article therein and maintaining longitudinal tension thereon to resist any tendency of the longitudinal edge portions to pull apart, and applying heat to the tube with the article therein while supported at the gripped portions without physically contacting any portion of the tube with the heat source, to shrink the tube transversely into intimate contact with the surface of the article and without pulling apart the overlapping and clinging longitudinal edge portions of the tube.

The method according to the invention has the advantage that the candles or other articles can be wrapped with an appropriate transparent film without the need for heat-sealing either the longitudinal edges of the wrapper or its ends when practised by machine, or for twisting of the ends of the wrapper when practised by hand, and in either case can achieve a neater appearance at lower cost than with known methods.

The improved method also lends itself readily to being practised either by hand or by automatic machinery for individually

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wrapping candles or other articles in a transparent film of material such as polyvinyl chloride.

The accompanying drawings illustrate one way of practising the method of this invention, and in which:

Figure 1 is a perspective view of a candle to be enwrapped;

Figure 2 is a perspective view of the same candle enwrapped in accordance with this invention;

Figure 3 is a perspective view illustrating diagrammatically the complete method of this invention as applied to the wrapping of candles;

Figure 4 is an enlarged view in side elevation, diagrammatically illustrating part of the structure used to practice the invention;

Figure 5 is a cross sectional view through Figure 3 on the plane of the line 5-5;

Figure 5 is a cross sectional view through Figure 3 on the plane of the line 6-6;

Figure 7 is a perspective view of a candle loosely enclosed in a tube of heat-shrinkable film material, to illustrate the relationship between the enwrapment and the candle before the enwrapment is shrunk into intimate contact with the candle; and

Figure 8 is a perspective view illustrating a detail of the machine or apparatus used in the practice of the invention.

Referring now particularly to the accompanying drawings, the numeral 5 designates a candle of the tapered, hand-dipped variety, shown in Figure 1 in its unwrapped state and in Figure 2 as fully enwrapped in accordance with this invention.

Candles of the hand-dipped variety generally have a base 6 of a shape and size to fit a standard candle holder or candelabra, and a tapering body with a wick 7 protruding from its more or less pointed upper end. It should be understood, however, that this invention is by no means limited to the wrapping of any particular kind of candle, or for that matter to candles alone. On the contrary the invention contemplates the wrapping of any article or object which, like a candle, cannot withstand high heat and is therefore not amenable to being wrapped in heat sealable and shrinkable material in the conventional manner, which involves holding a heated platen against the side of the candle to effect the sealing action.

It is a feature of this invention that the wrapping is done without any physical contact between the enwrapment and the heat source employed to effect the desired shrinkage of the enwrapment, and that heat sealing in the conventional sense is not involved in forming the enwrapment.

In broad outline, the method of this invention comprises the following steps:

1. Forming a tube of heat shrinkable film material loosely about the candle or other article to be wrapped by shaping a web of the film material about the candle with the longitudinal edges of the web overlapping;

2. With the candle thus loosely enclosed in a tube of heat-shrinkable film material, grasping the tube a short distance beyond each end of the candle; and then

3. Solely by these grasps on the tube, carrying the same with the candle in it past a heat source but without allowing any portion of the enwrapping tube to come into physical contact with the heat source.

The result is a package that is far superior to anything heretofore available. The wrapping hugs the surface of the candle regardless of its shape or contour, and no portion of the wrapping protrudes fin-like from the candle. At the ends of the candle the wrapping is substantially closed.

The material used for the enwrapment may be any one of several heat shrinkable thermoplastic films, preferably transparent, available upon the market; but, of course, the film chosen should not have a deleterious effect upon the candle, as for instance causing the colour of the candle to "bleed out." Examples of thermoplastic heat shrinkable materials suitable for the purpose are S.T. Vitafilm made by Goodyear Tyre and Rubber Company; Polypropolin, a product of Dow Chemical; Cry-O-Vac, a product of W. R. Grace Co.; and Reynolon, which is made and sold by Reynolds Aluminum Company.

Reynolon is especially well adapted to the purpose. This material has a sixty percent shrinkage factor, with complete shrinkage being produced in a very short time by relatively mild heat. Another desirable attribute of Reynolon is that it is not as limp as some of the other materials of this type and is therefore more readily handled by machines employed in the practice of the invention; and very important is the fact that this material holds a high charge of static electricity which causes it to cling tenaciously when overlapped.

To appreciate how his invention achieves its purpose without first heat-sealing the longitudinal edge portions of the enwrapment as has been deemed necessary in the past, it must be understood that Reynolon and the other suitable heat shrinkable films have the characteristic of not shrinking after the film material comes into contact with the article being wrapped. It is this quality of the heat shrinkable or thermoplastic materials that are suitable for the practice of this invention which makes possible the shrinkage of the tube in which the candle is loosely enclosed into intimate contact with the surface of the candle,

without having the overlapping longitudinal edge portions of the tube pull apart, despite the fact that they are not heat-sealed in the sense this term is ordinarily used in this art, but instead cohere to one another essentially only because of the effects of static electricity.

Although the method of this invention may be practiced by hand and also by apparatus other than that diagrammatically illustrated in the drawings, the illustrated apparatus has been found to be very well suited to the purpose.

The apparatus diagrammatically illustrated in the drawings essentially comprises an elongated horizontal table indicated generally by the numeral 8, along which a web 9 of transparent heat shrinkable thermoplastic film material is drawn from a roll 10 thereof mounted beneath one end portion of the table. In travelling from the roll onto the table, the web 9 passes over an idler roll 11 mounted at this end of the table. The web is continually drawn along the table by a plurality of rotating grippers 12 which successively grasp the web at the opposite end of the table.

The table 8 comprises two endwise adjacent sections 13 and 14, the former being formed, in cross section, into a shallow central convex trough portion 15 flanked by a pair of horizontal wings or flanges 16. The other table section 14 has a deeper U-shaped cross section.

The end portion of the table section 13 which is nearest the idler roll 11 provides a loading station A. The other table section 14, along with the adjacent end portion of the first section, provides a forming station B. The portion of the apparatus in which the rotating grippers 12 operate provides a shrink zone C which, of course, is equipped with a heat source.

At the loading station A, an operator successively deposits candles on the travelling web with the candles disposed lengthwise of the web and held from rolling off the web by the convex trough provided by the medial portion of the table section 13. As the web with a candle thereon leaves the loading station and enters the forming station, the web is progressively shaped into a tube 17 loosely enclosing the candle.

There is, of course, nothing new or novel in the concept of shaping a travelling web into a tube and any conventional means may be employed to effect this purpose. In the apparatus illustrated it is done by passing the web between two upstanding cylindrical bosses 18 mounted on the wings or flanges 16 of the table section 13. The distance between these upstanding boses is less than the width of the travelling web; hence, as the web travels between them, it is given a more pronounced trough shape. A short distance after the web leaves the bosses 18 its longitudinal edge portions are successively acted upon by a pair of tuckers 19 and 19'. These tuckers comprise longitudinally extending plates 20 over which the edge portions of the web pass while idler rollers 21 riding on the edge portions of the web pull the same transversely toward one another to thus overlap the same.

Since the plates 20 are relatively thin and substantially coplanar, the overlapping longitudinal edge portions of the web are in very close contiguity as they leave the tucker 19'. Hence, the strong attraction between the overlapping edge portions produced by the relatively high static charge which the film material carries, causes the edge portions to cling tenaciously to one another. As a result, a tube 17 is formed around the adjacent candle, and since the overlapping edge portions of the web are disposed at a substantial distance above the top of the candle, the just formed tube very loosely encloses the candle.

Each of the grippers 12 comprises a pair of hingedly connected jaws 23-24 which operate scissor-fashion to grip anything placed between them as the jaws close. The pairs of cooperating jaws are carried by a suitable rotating structure R, to travel in a circular orbit and to successively bring the same into receiving position to grip the tube 17. As the jaws approach this receiving position, they are open, and just as they reach the receiving position they are automatically closed.

Obviously the spacing between adjacent pairs of jaws is governed by the length of the candle being wrapped, this spacing being somewhat greater than the length of the candle. Also the timing of the placement of the candles on the travelling web and the length of time required for the web to travel the distance from the loading station A to the pair of jaws in position to grip or grasp the tube 17 must be such that a pair of jaws is always in position to grip the tube a short distance ahead of the approaching candle and a short distance behind the trailing end of the preceding candle.

It is the gripping of the tube 17 by the jaws of the grippers 12 and the rotation of the jaws which advances the web past the loading and forming stations and since the grippers rotate at uniform speed this advance advance of the web is uniform. It should also be observed that the natural drag imposed upon the advance of the web by the need for stripping it from the roll 10 assures that the web will be maintained in tension as it travels along; and if desired any suitable means may be employed to increase the longitudinal tension under which the web is maintained. It is important, though, that the web be under tension

at all times. This is especially so after the web is formed into a tube 17 and is in the grasp of two adjacent grippers, since it is the grippers alone which carry the tube-enwrapped candles past the heat source of the shrink zone C.

In the apparatus illustrated, the heat source in the shrink zone C consists of a blast of hot air emanating from one or more blowers 25, and heated by electric heating units not shown. The blower or blowers are spaced from the path of the tubular enwrapment with the candles therein, but direct the hot air issuing therefrom onto the enwrapped candles as they pass. It will be noted that the overlapping longitudinal edges of the enwrapment face the heat source as the enwrapped candles are carried therepast. Accordingly, some cohesion between the overlapping edge portions of the enwrapment is produced by the heat, but primarily it is the clinging effect due to static which keeps the edge portions in contact. The instant the film material contacts the surface of the candle, it shrinks no farther. The overlapping longitudinal edge portions of the enwrapment thus do not pull apart.

Accordingly, when the enwrapped candles leave the shrink zone C, the enwrapment hugs the candles with a skin tight fit, regardless of the contour of the candles. Candles of the so-called, twist-type, in which the surface has a helically grooved formation, as well as ordinary tapered candles, have been very successfully and very beautifully wrapped in the practice of this invention.

Not only does the enwrapment shrink into intimate contact with the surface of the candle but, in addition, the portions of the tube that are in the grip of the jaws 12 likewise shrink so that the finished enwrapment is as shown in Figure 2, with the end portions of the enwrapment substantially closed.

Obviously, of course, the temperature at the heat source in the shrink zone C, and the rate at which the candles are carried past it, must be correlated to bring about the desired results; and while this is a matter that can easily be determined empirically by those skilled in the art, for purposes of illustration—using Reynolon of one-half mil thickness as the heat shrinkable thermoplastic film material—a hot air blast of 400°F. with the web, and hence the candles, travelling at ninety feet per minute, provides excellent results.

As each wrapped candle leaves the shrink zone, it is severed from the next successive candle and hence from the web. This is preferably done automatically by depressing a spring supported knife 30 with which each jaw 24 is equipped, as the jaw passes a knife actuating cam, not shown. Thus severed from the web the wrapped candles may drop onto a delivery chute or elevator, not shown, which carries them to a packaging station where the enwrapped candles are placed in boxes.

From the foregoing description taken with the accompanying drawings, it will be apparent to those skilled in this art that this invention, for the first time, makes it possible to economically wrap candles and similar articles that cannot withstand heat, in heat shrinkable thermoplastic film and, in doing so, enhances the appearance of the wrapped candle.

WHAT WE CLAIM IS:—

1. A method of wrapping candles or other articles which are likely to be damaged by heat, which comprises the steps of: depositing the article on a web of heat shrinkable film material which has the property of holding a charge of static electricity and by virtue thereof, clinging to itself when lapped, the article being disposed lengthwise of the web, shaping the web into a tube loosely enclosing the article and bringing the longitudinal side edge portions of the web into overlapping contiguity to thereby cause the same to cling to one another, gripping the tube a short distance beyond each end of the article therein and maintaining longitudinal tension thereon to resist any tendency of the longitudinal edge portions to pull apart, and applying heat to the tube with the article therein while supported at the gripped portions without physically contacting any portion of the tube with the heat source, to shrink the tube transversely into intimate contact with the surface of the article and without pulling apart the overlapped and clinging longitudinal edge portions of the tube.

2. A method of wrapping candles or other articles which are likely to be damaged by heat, which comprises the steps of: moving a web of heat shrinkable film material which has the property of holding a charge of static electricity and by virtue thereof clinging to itself when lapped, lengthwise along a defined path which leads successively past a loading station and a forming station; at the loading station depositing a candle or other article on the moving web with the article disposed lengthwise of the web; at the forming station shaping the travelling web into a tube loosely enclosing the article, and bringing the longitudinal side edge portions of the web into overlapping contguity to thereby cause the same to cling to one another by the inherent tendency of the material to cling to itself; gripping the tube a short distance beyond each end of the article therein; by said grips on the tube maintaining longitudinal tension thereon to thereby at all times resist any tendency of

the longitudinal edge portions to pull apart; solely by said grips and with the tube longitudinally tensioned and its longitudinal edges clinging to one another, carrying the tube with the article therein through a shrink zone; as the tube with the article therein is thus carried through the shrink zone applying heat thereto without physically contacting any portion of the tube with the heat source, to shrink the tube transversely into intimate contact with the surface of the article and without pulling apart the overlapped and clinging longitudinal edge portions of the tube severing the enwrapped article from the web.

3. The method of wrapping candles which comprises the steps of: providing a rolled web of heat shrinkable film material which has the property of holding a charge of static electricity and by virtue thereof clinging to itself when lapped; grasping the web and pulling it off the roll with the web in longitudinal tension and travelling lengthwise along a defined path which leads successively past a loading station and a forming station; at the loading station depositing candles, successively upon the moving web with the candles disposed lengthwise of the web and in endwise spaced relation; at the forming station shaping the travelling web into a tube with the longitudinal edge portions thereof overlapped but spaced above the adjacent candle so that the tube loosely enwraps the candle; by the tension on the web and the mutual attraction between the overlapped edge portions of the tube due to static, causing the edge portions thereof to cling to each other grasping the tube a short distance beyond each end of the candle therein; by said grasps maintaining longitudinal tension on the tube to thereby at all times resist any tendency of the longitudinal edge portions of the tube to pull apart and solely by said grasps carrying the tube with the candle therein through a shrink zone; as the tube with the candle therein is thus carried through the shrink zone, subjecting it to a blast of hot air to thereby shrink the tube into intimate contact with the surface of the candle without pulling apart the overlapping and clinging edge portions of the tube; and as the thus enwrapped candle leaves the shrink zone, severing the same from the web.

4. A method of wrapping candles or other articles as claimed in Claim 1 and substantially as hereinbefore described.

5. Apparatus for wraping candles by the method as claimed in Claim 3 and substantially as hereinbefore described with reference to the accompanying drawings.

6. A candle or other article wrapped in heat shrinkable film material by the method claimed in any of Claims 1 to 3.

7. A candle or other article which is likely to be damaged by heat, wrapped in a sheet of heat-shrinkable film material which has the property of holding a charge of static electriciay and by virtue thereof clinging to itself when lapped, the longitudinal side edge portions of the sheet clinging to one another in overlapping contiguity longitudinally of the candle or other article, and the film material being heat shrunk on to the candle or other article while held in longitudinal tension and without physical contact between the heat source and film material, so that the candle or other article is encased in a tube of the film material in intimate contact with the surface of the candle or other article.

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Fig. 1.

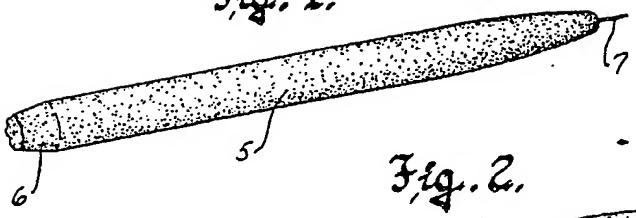


Fig. 2.

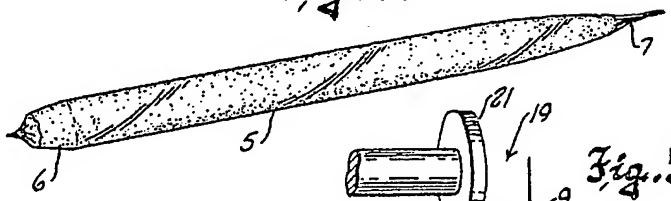


Fig. 5.

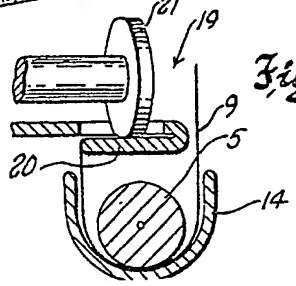


Fig. 4.

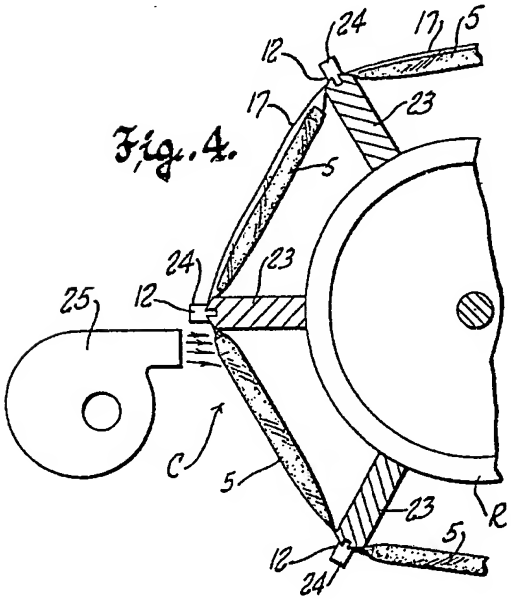


Fig. 3

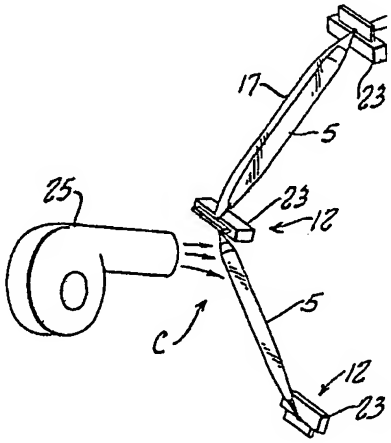


Fig. 6.

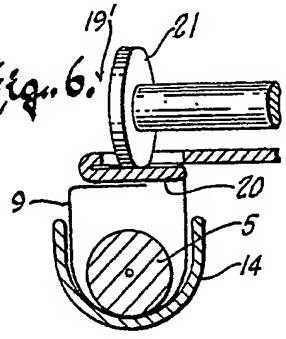

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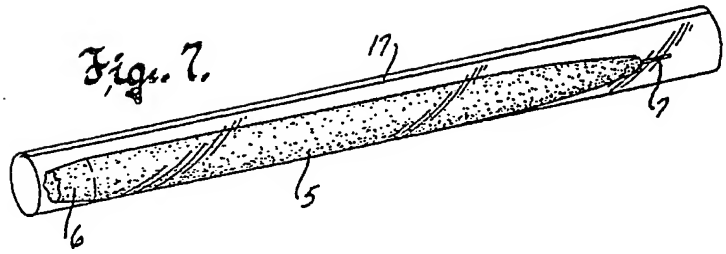
Fig. 7.



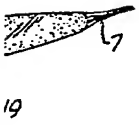




Fig. 5.

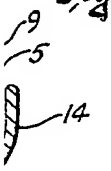



Fig. 3.

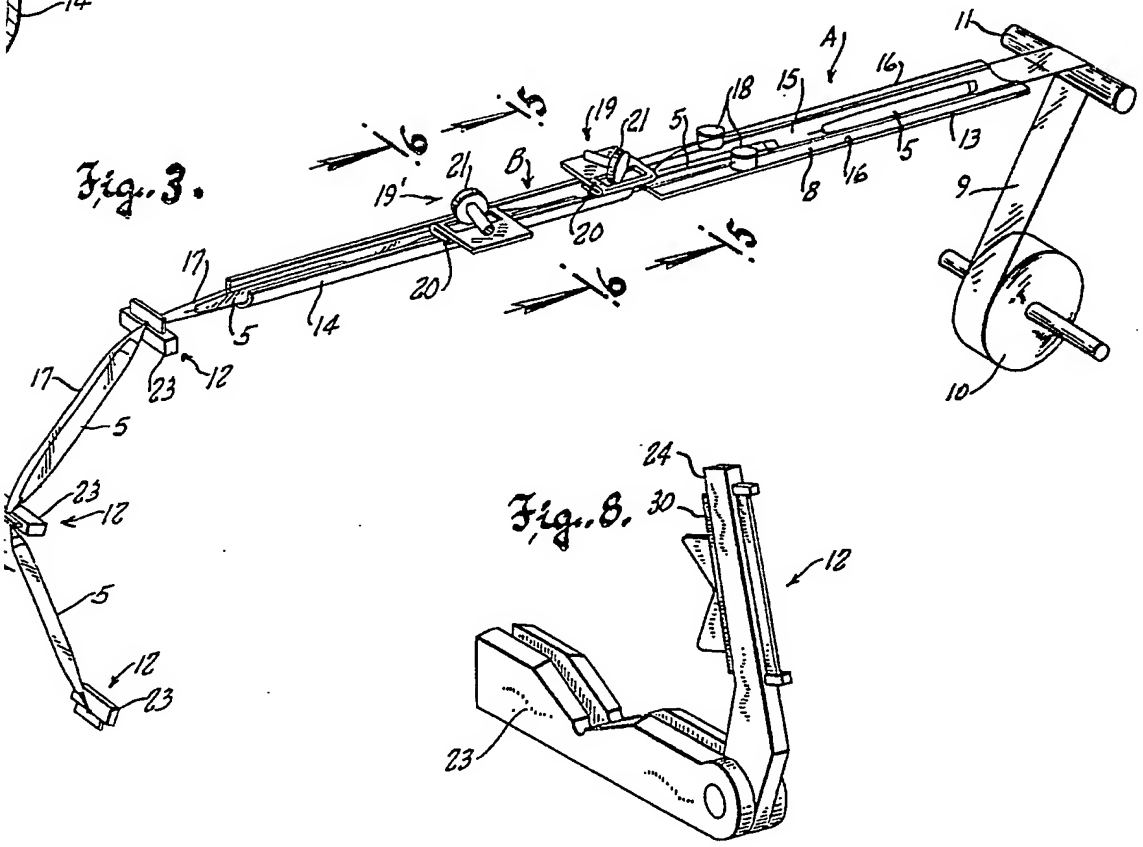



Fig. 8.

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Fig. 1.

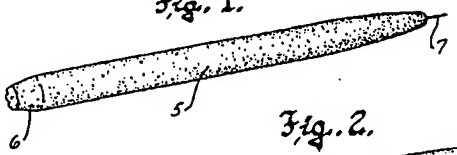


Fig. 2.


Fig. 7.

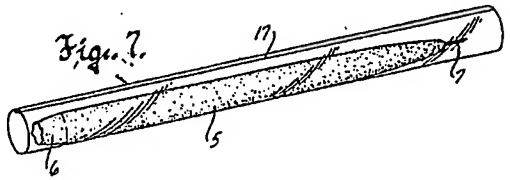


Fig. 5.

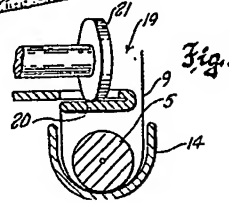


Fig. 4.

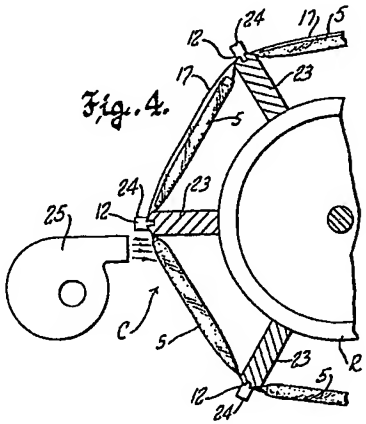


Fig. 3.

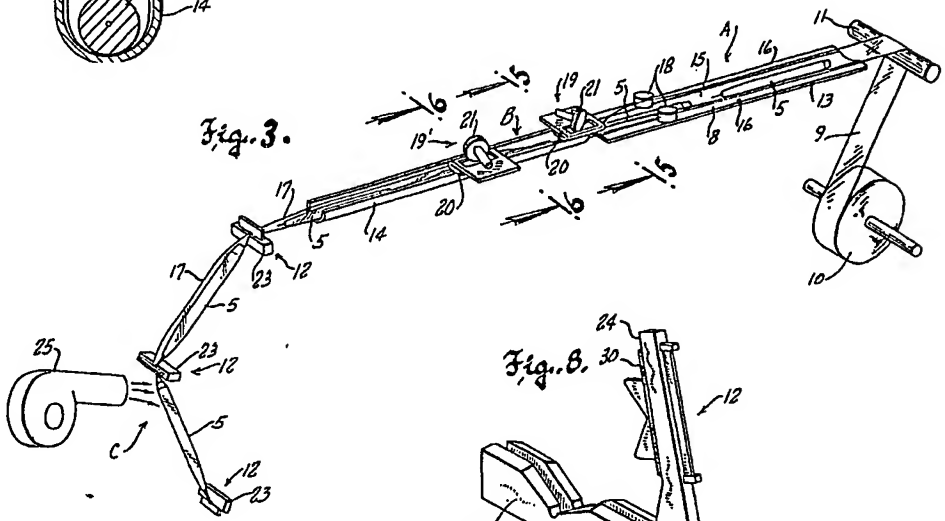


Fig. 6.

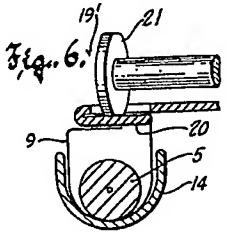


Fig. 8.